

IB chemistry Drugs and Medicine - Worksheet 6 Ethanol and Ethanol Detection

1. One method for detecting alcohol in breath involves blowing through a tube containing crystals of acidified potassium dichromate(VI). The alcohol turns the crystals from orange to green. Explain what happens to both the dichromate(VI) ion and the alcohol in this reaction.

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2. A modern method for accurately determining the amount of alcohol in breath uses an intoximeter. Explain how an intoximeter works.

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3. Suggest why it is advisable not to drink alcohol when taking other drugs.

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4. The breathalyser can be used to detect ethanol in breath. Explain how this can be done, by reference to the substance used, the colour change and the type of reaction occurring.

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Mark Scheme

1. the dichromate(VI) ion is reduced / forms the Cr^{3+} ion; the ethanol is

oxidized / forms ethanal / ethanoic acid;

2. sample of breath passed into infrared spectrometer; ethanol in breath absorbs because of OH group; machine compares breath with air/reference sample with no breath;
3. alcohol has a synergistic effect / *OWTTE* with other drugs; alcohol depresses central nervous system which enhances the effect of other drugs which have a sedative effect on CNS / increased risk of stomach bleeding with aspirin; alcohol can reduce the effectiveness of some drugs;
- 4 potassium dichromate(VI) (oxidation number and presence of acid not essential); orange to green;
redox (*accept reduction / oxidation*); 3